



KILLARNEY. No. VII.



MACGILLICUDDY'S REEKS, FROM AGHADOE.

THE MOUNTAINS—MACGILLICUDDY'S REEKS.

As the two lower lakes at Killarney lie at the foot of the range of mountains upon which the third, or Upper Lake is situated, the side of them turned towards that lake, or, in other words, their western shores, are bounded by those mountains. The first mountain in the chain which thus separates the Lower Lakes from the Upper Lake is that of Turk. It forms the boundary of the south-western side of the middle lake, which has from that circumstance received the appellation of Turk Lake. By the side of this mountain there is a defile in the chain, through which flows the river from the Upper Lake.

The next mountain to the northward, or that upon the opposite side of the defile, is Glenna, which bounds a portion of the western side of the Lower Lake. It projects forward beyond the line of Turk Mountain, and forms, in fact, a promontory jutting out into the lake; thus it presents two sides to the water, one of them overhanging the bay of Glenna, as the corner of the lake to the southward is called, and the other opening to the northward upon the broadest part of the lake. Both of these mountains rise abruptly from the water, and are marked by numerous bold breaks and projecting rocks. The summit of Glenna mountains is "bare, naked, barren, wild, and rugged,"

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while the base is clothed with trees of rich and varied shades, almost dipping their foliage in the water

Tomies Mountain, the next in succession to the northward, and the last whose base is washed by the lake, rises more gradually than the others, and at its sloping base presents to view a considerable tract of fertile ground, which is under cultivation.

Until the sun has ascended to his meridian height, the mountains bordering upon the Lower Lake remain in shadow. Their surface then appears tame and unvaried, and their summit, if it be in clear weather, forms a hard outline against the azure sky; but, as the day advances, the sun crosses the line of the great chain, and darts his rays on that side of the mountains which lies next to the lake. All their bold irregularities are then revealed, their protruding rocks, their deep glens; "and the lake, illumined by the gleams which pass athwart its peaceful waves, appears resplendent amidst the dark and wooded islands:"—

..... The horizontal clouds  
With purple dyes and fissures edged with gold,  
Streak the calm ether, while through the sparkling haze  
The faint hills glimmer; fainter as their chains  
Approach the fount of brightness; fainter still  
Where sunk the parting orb, and with the sky  
In undistinguishable splendour joined.

Mr. Weld says that he has sometimes imagined that the sun set with more splendour at Killarney than in other parts of the country; indeed, he adds, there can be no doubt that the diversity of light and colours in the sky is augmented by the vast collections of clouds which are attracted by the mountains as they come from the Atlantic,—

Or whirled tempestuous by the gusty wind,  
Or silent borne along, heavy and slow,  
With the big stores of steaming ocean charged.

These clouds, he says, not only occasion the most grand and beautiful effects at the approach of evening, but "exhibit infinite vicissitudes of light and shade throughout the day, altering every hour the face of the landscape." An older writer expresses a similar opinion, stating that the effect of the view is, in his opinion, much heightened by the hourly revolutions in the face of the heavens.

The vast volumes of clouds which are rolled together from the Atlantic and rest on the summits of the mountains, clothe them with majesty: the different masses of light and shade traversing the lakes in succession, as the shifting bodies above float across them, exhibit all the varieties of night and day almost at the same instant: the mists interposing their dull yet transparent coverings to the view, raise new desires of a fallen and clearer prospect; and the wandering vapours flitting from cliff to cliff, as if in search of the clouds from which they have been separated, amuse the eye with their varieties and irregular motions.

But "every white will have its black." The clouds and mists at Killarney, like clouds and mists elsewhere, bring with them something more than majesty to the prospect; and occasion other "vicissitudes" than those of light and shade in the face of the landscape. The west of Ireland is remarkable for its rains; and certainly in no part of it is that feature of the climate so prominently developed as at Killarney. Hence arises a serious drawback upon its attractions; or as the writer last quoted says,—

After all this happy spot labours under one disadvantage, and one, too, which I am the more averse to mention, since so celebrated a writer as Dr. Johnson has thought it sufficient in the case of Loch Lomond, to counterbalance so many natural beauties; and this is no other than the immense rains; which fall here more abundantly, and that even in the best seasons for visiting the lake, than in all other parts of the kingdom.

Upon this account a lengthened residence at Killarney is necessary to a full enjoyment of its beauties. The space assigned for the regular performance of the tour is three days,—though, to accommodate all classes, a mode has been devised of "doing it" in two, or even in one day. But, for the ordinary traveller to expect three consecutive fine days under the sky of Killarney, would be scarcely more reasonable than asking for the ocean in the deserts of Africa. Yet to this very drawback upon the attractions of Killarney, we trace those attractions themselves; and instead of complaining, we shall do well to recollect that the limitations here set to our pleasures are necessary to our being pleased at all, that what we at first call a disadvantage is the spring and source of all we admire,—

That the Hyades are here the handmaids of Flora; for that without their perpetual effusions of rain we complain of, the rocks must resign their vegetable inhabitant, the rivers mourn their exhausted urns, and the cascades no longer resound in the dull ear of memory; that the living lake itself must dwindle into an inconsiderable pool, and the mountains stripped of their honours become a dreary waste, the abode of gloom and barrenness.

We have said that the mountains of Glenna and Tomies are seated upon the western bank of the Lower Lake. Beyond them, still further to the westward, is a range of other mountains which runs to-

wards the Atlantic, in a direction at right angles to theirs, or in such a manner that if it ran towards the east instead of towards the west, it would cut the lake in half. This range bears the name of Macgillicuddy's Reeks, the appellation of Macgillicuddy being derived, according to the common account, from an old family once flourishing in these parts, and that of Reeks being applied to the mountains because of their sharp jagged peaks. One of these peaks called Carran Tual, or Gheraun Tual, (from some resemblance in it to an "inverted sickle,") is the loftiest summit of all Ireland, measuring 3394 feet.

As the Reeks lie behind the mountains which bound the western bank of the Lower Lake, they are, of course, not to be seen from every point of view; if the spectator be too close they are hidden. From the hills upon the opposite or eastern side of the lake they appear to advantage, towering above the heads of Glenna and Tomies. But the best view of them is obtained from the hills upon the northern border of the lake; and this is the view which is represented in our engraving, the spectator being placed on the hill of Aghadoc, close to the ruins of the ancient cathedral of that name. The extensive prospect which this height commands is constantly recommended to the tourist; and certainly it is one of the most remarkable which he will enjoy at Killarney.

From hence (says Smith, the historian of Kerry), is to be seen one of the most delicious landscapes in Ireland, and perhaps few countries in Europe afford better; but this is such a masterpiece, that even the Poussins, Salvator Rosa, or the most eminent painter in that way, might here furnish himself with sufficient matter, not only to form one but several entertaining prospects. From this eminence a survey may be taken of the greatest part of this beautiful lake, and likewise of that stupendous amphitheatre of mountains which are raised along the opposite shores. Towards the south-east stands the mountain called Mangerton, whose feet the lake washes, and whose summit is generally lost in the clouds, it being justly esteemed one of the highest mountains in Ireland\*. More towards the centre of the lake is a high mole, called Turk, whose sides, down to the verge of the water, are beautifully clothed with groves of various kinds of trees. One part of this hill slopes away like a promontory terminating in the lake, forming one side of a canal, which is a passage into the Upper Lake, as doth the front of another mountain, called Glenna, the other side of this strait, which is adorned also with forest trees. As a fine contrast to this verdure, at the backs of these mountains stand others shaped into pyramids, being only naked rocks of a vast height. The grandeur and magnificence of these mountains, not only entertain and surprise the spectator, but he must be also agreeably amused in contemplating the infinite variety of beautiful colouring they afford. For in this part may be seen the gayest verdure, blended with scarlet fruit and snowy blossoms, well known properties of the *Arbutus*; and in other places the most elegant variety of brown and yellow tints, caused by other kinds of trees and shrubs, appears; all these are intermixed with rock-work, and, to soften the whole, a deep, smooth, and noble basin of water extends itself beneath this scenery; but to give the reader an adequate idea of this place would require the pencil of some excellent painter rather than the pen of any prose writer.

To the west of Glenna stands the lofty peak called Tomish, variegated half-way to its top with a waving forest, and down whose sides, especially after rains, run very considerable cataracts into the Great Lake. There are many other hills still running more west, as far as the eye can reach, for many miles; the nearest, and most surprising for their loftiness, are the *Reeks*, already mentioned, whose tops resemble so many pinnacles, or rather spires, lost in the clouds.

Carran Tual being the highest mountain in Ireland,

\* When Dr. Smith wrote, Mangerton was generally considered the highest mountain in Ireland, although it is nearly nine hundred feet lower than its close neighbour Carran Tual;—a fact which shows most strikingly how fallacious a guide is the appearance of mountains in estimating even their comparative height.

the ascent to its summit forms a notable exploit with the more active and adventurous of the visitors to Killarney. The excursion, though a fatiguing one, is unattended with danger; and it affords many fine mountain scenes which, even without the extensive prospect from the summit, would be amply sufficient to reward the traveller for the toil of the ascent. Even the lower Reeks are well worth the labour of a visit; Mr. Weld ascended one of them, which the ignorance of his guides led him to mistake for Carran Tual, and he described the scenery which he beheld as sublime in the extreme. The party proceeded first to Dunloh Gap\*, and having advanced into it to the distance of half a mile, began to ascend the mountain on their right. It proved extremely difficult of access, and in many parts so steep, that, without the aid of the sapling oaks which spring from their fissures, it would have been impossible to scale the rocks. On the summit of this mountain they found an extensive tract of ground, less encumbered with rocks than the valley below, and covered, as far as the eye could see, with heath and coarse grass, on which innumerable herds of cattle were fed. Beyond it appeared another mountain extremely rugged, which they reached at the end of two hours. The ascent was not steep; but it was laborious and tedious, owing to the immense heaps of loose stones in some places, and in others deep rents, which could not be passed without the utmost caution. Along this part of the route, the only animals they observed were eagles, of which numbers hovered above them as if alarmed at the invasion of their lofty solitudes: at one moment they counted no less than twelve of them within gun-shot.

The craggy tops of the Reeks appeared on reaching the summit of this latter mountain; and after walking for about an hour over a rugged way, nearly similar to that which they had already traversed, they gained one of the loftiest pinnacles, which their guides told them was Carran Tual.

It is scarcely possible (says Mr. Weld), to convey an idea of the sublime view which was now unfolded to our eyes. On each side lay a vast precipice, beyond which arose other immense mountains: still further on we saw the Atlantic Ocean bounding the horizon for a great distance; and in the opposite direction a wide expanse of the inland country, watered by innumerable rivers and lakes, among which that of Killarney was only conspicuous for its superior extent. One of the peaks before us seemed to be considerably more lofty than that which we had ascended; but the guides persisted in assuring us that the appearance was deceptive; and that if from any third station we could compare its elevation with that of the point on which we then stood, the superior height of the latter would be obvious. The intervening precipices were impassable; as it was out of our power, therefore, to make the trial, we were satisfied to receive this intelligence as conviction; and, perhaps, none of us, after so much fatigue, were willing to entertain a doubt of having attained the object of our laborious undertaking.

The mountain here described resembles in shape a wedge; at the summit it presented a long craggy ridge, so narrow, that whilst they stood upon it we could look into the depths of the precipices at either side, or drop pebbles into them from each hand at the same moment. Large masses of rock are often detached from the ridge, through the incessant action of mists and vapours prevailing in these high regions, and especially after the snow begins to dissolve. They roll down the mountain with a loud roar, but fortunately there are no dwellings which they can reach in their descent.

The party descended the mountain by the opposite side, under the full impression that they had scaled

its highest peak, and directing their steps towards the Upper Lake, reached a cottage at which they rested.

On recounting the adventures of the day, and boasting of having been on the highest ground in Ireland, an old gray-headed man who stood by expressed some doubt of the fact; adding that if we had really been on the most lofty point of the Reeks, it would have been impossible for us to have returned before night. We appealed to our guides, who, jealous of their reputation, of course confirmed our story; to put this matter beyond doubt, however, the old man requested us to come to the door and point out the mountain we had ascended. The Reeks rose in full view before the cottage, and we could easily trace our route to the most lofty peak. This was sufficient to confirm his first supposition. Gheraun-tuel, he told us, was much higher than any of the other points, and was neither visible from the valley in which we stood, nor from any part of the lake of Killarney. It was to no purpose that the guides maintained the contrary, the evidence of our own senses had already impeached their knowledge, and their ignorance of the country was now proved by the concurrent testimony of several mountaineers. The difficulty of ascending Gheraun-tuel was represented to us as very great, and no stranger, we were told, had ever attempted it. This was but an additional incentive to undertaking the enterprise; and the old man having offered his son as a guide, the next day but one was appointed for the expedition.

There are two routes by which the ascent of Carran Tual is now made. By one of them the traveller proceeds along the northern shore of the Lower Lake to Dunloh Castle, and keeps a straight course beyond it in the same direction, after skirting the northern side of the Reeks for some distance, until he arrives at that part of their base above which towers the object of his search. The other route is by the Upper Lake, whence he enters a valley which leads him to a similar point on the opposite or southern side of the Reeks.

The valley through which the latter route conducts him bears the name of Comme Duff, or the Black Valley; it is watered by a chain of small lakes and a river connecting them together. This valley bears some resemblance to the Gap of Dunloh; but the scenery is much tamer, and is rather to be admired for the delightful verdure of the peaceful and retired meads than for the boldness of the rocks, or the height and abruptness of the impending precipices. After passing into another valley, which branches off from this, and proceeding for a considerable distance, he begins to climb a mountain, which, though steep, is not difficult of ascent; on the summit is a long plain, which forms the body, as it were, of the mountain mass out of which the Reeks rise. At the end of this plain, which is covered with coarse grass, is seen the conical head of Carran Tual. Advancing towards it the traveller has to proceed four or five miles before it discloses itself fully to his view; at length he reaches the brink of a precipice, when a complete view of it opens. Mr. Weld thus describes its appearance:—

It rose with great regularity in the form of a cone, and to appearance stood quite insulated except on the nearest side, where it was connected with the mountain on which we stood by a sort of spur, forming an isthmus, and bearing a resemblance, though on a scale of such great magnitude, to the artificial approach to an old castle. At the height from which we viewed it, this pass did not seem to be wider than might be sufficient for a single carriage; and though on descending we found it at least sixty feet broad, yet the immense depth and great abruptness of the precipices at each side so imposed on the senses, that we could scarcely persuade ourselves of being in perfect safety in its very centre. Here, however, we halted at once to admire the sublimity of the scene, and to take some refreshment and repose. From this place to the summit the distance did not appear to be very great, as the slope, owing to our contiguity to the mountain, was fore-shortened; but though we advanced with ardour and the way, except being very

\* For an account of this remarkable defile, see *Saturday Magazine*, Vol. XII. p. 93



steep, was not incommodious, we did not arrive at the top until an hour and a half after we had set out.

The top of the mountain presents a smooth area, nearly circular; it is about thirty feet in diameter, and from every side there is an uniform slope down. The stones are split into small flags, which, in many cases, are also broken crosswise; thus the summit is composed of a species of shingle, which, after a heavy fall of snow, is carried down in considerable quantities in the thaw; for this reason it has been said, that the height of the Reeks has probably diminished in the lapse of time.

From the summit of Carran Tual a most commanding view is obtained. To the north, Dingle Bay, and the whole of the sea-coast between it and the river Shannon; and in the opposite direction, Kenmare River, Bantry Bay, and the other great estuaries in this part of Kerry, are all distinctly spread out. The other rocks appear like so many inclined planes, whose angles of inclination are all equal, so that they appear to lie in parallel strata. On the tops of several are small lakes, like those on Mangerton and other high mountains on the range. The inland view is less interesting than that obtained from others of the Reeks whose height is not so great; few of the lakes can be distinguished, and the beauty and variety of the scenery surrounding them is lost in the immensity of the distance. The spectator gazes with wonder upon the stupendous prospect which is spread around him, but the intense cold prevailing at this lofty elevation, renders unpleasant a stay of any length on the summit of Carran Tual.

The descent from the isthmus or ridge, which connects Carran Tual with the other Reeks, into the valley of Comme Duff, is tedious but not difficult, the steepness of the declivities rendering it exceedingly fatiguing. Mr. Weld, who descended on this side, speaks of his route as somewhat hazardous. He tells us, that shortly after leaving the isthmus, his party were conducted to a precipice, at least sixty feet deep, down which they were told that it was necessary for them to take their course.

The proposal (he says) startled us, nor did we conceive how it was practicable; but the guide seating himself at the brink of it, on a rock which presented an even face nearly to the bottom of the precipice, slid down it, taking the precaution, however, to impede the velocity of the descent, by catching hold of the tufts of long grass which grew from the crevices at each side. This example was followed without hesitation; and having accelerated our descent down the steepest part of the mountain, by sliding over other rocks of a similar description, we soon reached the bottom.

Having reached the valley of Comme Duff, the visitor makes his way, over a rugged and stony path, for the distance of about four miles; when he has reached the banks of the Upper Lake, it is customary to have a boat in waiting, by previous arrangement, to convey him homeward. It will be late before he arrives at the town of Killarney; sixteen or seventeen hours are scarcely sufficient for the whole day's excursion, so that if he have started as early as five in the morning, he will not return much before midnight.

Besides Glens and Tomish there is another mountain adjoining the Reeks, which is deserving of notice. It is connected with that of Glens, and with it forms one side of the Gap of Dunlo, the Reeks forming the other. This mountain is called the Purple Mountain, from the large loose fragments of stone about its summit, the debris of the rugged cliffs of a dark purplish clay-slate, which give to the mountains that hue when viewed from a distance below. From Mr. Barrow's account it seems to be deserving of a visit.

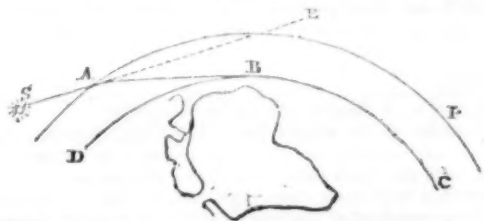
I made the ascent (he says) in about an hour. The day

was as fine as ever shone from the heavens; it was one day in a hundred, as the guide remarked, not a cloud to interrupt the view, and the whole range of Macgillicuddy's Reeks, with their peaked and jagged summits lay beautifully before me. The prospect was varied, extensive, and grand. On the west was the silver stream of the Laune, meandering into Dingle Bay, and a little to the left the great cluster of the Iveragh Mountains; on the south-west, the River and Bay of Kenmare; on the south, and close at hand, the rounded and unsightly summit of Mangerton, boasting an elevation of about 2550 feet; and on the east, the grounds and Abbey of Mucross; but Ross Castle, with its well-planted island, and beyond it the town of Killarney, were from this point hidden from the sight. On the summit of the Purple Mountain a heap of stones was piled up, on which I suppose the officers employed in the Trigonometrical Survey of Ireland had fixed their staffs, as these piles are observable on all the highest points in the island.

### TWILIGHT.

IN those portions of the globe where the atmosphere is frequently obscured by clouds and mists, and where the nights in some parts of the year greatly exceed the days in length, we enjoy the cheering influence of light for a short time before the sun has actually risen, and again after it has set. This mellow and pleasing light, which we call twilight, arises from the refractive power of the air, by which the rays of the sun are bent from their direct course, and partially illuminate the earth for a limited time after it has set, and before it has risen.

The mode in which this beautiful effect is produced may be illustrated by the following diagram. Let  $n$   $b$   $c$  represent part of the circumference of the earth, and the line  $a$   $p$  the boundary of the atmosphere by



which the earth is surrounded;  $s$  is the sun at some distance below the horizon, that is, out of the sight of an individual placed at  $n$ , and consequently a ray of light proceeding in the direction  $s$   $a$   $e$  could never reach the earth at  $n$ , if it was not for some counter-acting cause: this cause we find in the refractive power of the atmosphere. (We have explained the phenomena of refraction in the *Saturday Magazine*, Vol. XI., p. 77.—*Amusements of Optics*.) The ray of light in its passage towards  $z$  meets with the atmosphere of the earth somewhere about  $A$ , and is bent from its direct course towards  $n$ , so that those who live at  $n$  on the earth's surface enjoy the effects of the sun's rays for a considerable time after that luminary would be otherwise out of sight.

Twilight varies in duration at different times of the year, and in various parts of the globe. Between the tropics it is scarcely known, the brilliant nights of these climates rendering it unnecessary; so that the passage from day to night, and from night to day, is almost without an interval. Sir Walter Scott alludes to this in his poem of *Rokeby*, when he puts these words in the mouth of the pirate Bertram Risingham.

And now, my race of terror run,  
Mine be the eve of tropic sun;  
No pale gradations quench his ray,  
No twilight dews his wrath allay.  
With disk like battle target red,  
He rushes to his burning bed;  
Dyes the wide waves with ruddy light,  
Then sinks at once,—and all is night.

## THE USEFUL ARTS. No. XXXIV\*.

## MASONRY.

WHEN the stone is sawed to the proper size, the surfaces which will be exposed to view, are to be made smooth and even. The tools used by the mason for this purpose consist of iron chisels, of different widths, and, principally, of a sharp-pointed one, called a *pointer*; these chisels are struck with a mallet made of a conical-formed lump of hard wood, fixed on a short handle.

The *pointer* is used for chipping off the principal roughnesses on the face and edges, and for working the whole face over to bring it level, the workman trying his work by applying a *straight-edge* occasionally to it. When the front and edges are made *true*, the face is sometimes *tooled* over, so as to leave regular furrows in it, according to certain forms, by which the different kinds of work are distinguished. But this practice is going out of use, now that soft free-stone is so much employed in building. In old edifices, such as St. Paul's, Whitehall, &c., &c., the stone will be found to be wrought on its face in the manner alluded to.

Stones in buildings are not only fixed with mortar, as bricks are, but are further secured in their places by being clamped together with iron clamps. These are short iron bars, from seven to twelve inches long, one and a half wide, and half an inch thick, according to the size of the stone; the ends of the clamps are turned down a little, to afford a better hold. A channel is cut in the two contiguous stones deep enough for the clamp to lie in, and the ends of the channel are sunk deeper, to receive the turned-down ends of the clamp; when this is put into the channel, molten lead is poured in to fill up the interstices, to keep the clamp in its place, and to prevent its rusting by wet getting to it.

From the expense of carrying and working stone, the walls of buildings at a distance from a quarry are seldom, now, built of solid stone, but a facing of this material is applied only on the external surface of the wall, which is built of brick. This kind of work is called *ashler* work, and both the brick and stone-work must be executed with considerable care, to enable a wall composed of two materials to preserve its perpendicularity; it being obvious, that if the brick part yielded to the weight, it must, from its construction, do so more than the stone facing, and, therefore, the wall would bend inwards and become crippled.

The width of the courses of ashlers must, therefore, be made equal, exactly to a certain number of courses of bricks with the intervening mortar, and the brickwork must be executed with such care, that this number of courses may be everywhere of the same width in the whole height of the wall. In every course of ashler there must be solid stones laid quite, or nearly quite, across the width of the wall, to form a *bond* to the stone facing, and all the stones of the ashler must be fixed with iron cramps to one another and to these bond-stones. But however carefully a faced wall may be executed, it is never so firm or durable as one built entirely of either material; indeed, if well executed, of good materials, and of competent thickness in proportion to its height, a brick-wall is the most durable, light, and efficient structure that can be erected.

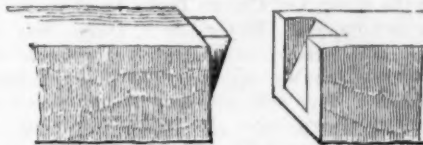
When stone is to be cut into cornices, mouldings, &c., the blocks having been sawed, the ends top and bottom are worked very true and parallel, or perpendicular to each other, and one edge or *arris* cut to a perfectly straight line; a thin wooden mould of the section of the cornice is then applied to each end, and the profile of the mouldings marked out on the stone. The workman being guided by this figure, cuts away the stone down to the general surface of the mouldings, and then proceeds to get the flat fillets of the mouldings perfectly straight and true by the rule; these again guide him in working the curved mouldings, such as *ovolos*, *cavettos*, *cyma rectas*, and *ogees*; when these are cut nearly to their profile, and perfectly straight on the *bed* line, they are finished off by being rubbed down smooth by thin long straight-edges of stone.

Foliage and carved work is executed by a better kind of workman, possessing some of the taste of an artist, and he works on the same general principles as a sculptor when executing a statue; it would be foreign to the object of these papers, therefore, to dwell on this branch of the mason's art.

It often, or even most commonly occurs, that the distance between two columns of a portico, is of greater length than a stone can be obtained, and if the architrave, or that part

of the *entablature* immediately over the capitals of the columns be looked at attentively, a stone will be perceived between the columns apparently unsupported, for neither end rests on the column, and the joints of those ends are upright, not presenting any character of a *voussoir*-stone or arch. The contrivance by which such an architrave stone is supported deserves to be described.

The stone in question has a projecting part, wrought at each end, of the form shown in the annexed figure; this projection is received into a corresponding cavity, cut in the end of the stone supported by the column, and the joint is thus really an arched or wedge-shaped one, though the bevel line is concealed, and the two stones, when put together, present only a vertical joint.



The mason, in common with the bricklayer, uses *squares*, *levels*, *plumb-lines*, and *straight-edges* to set out his work, and trowels and mortar to set the stones with; but the latter is rather used to make the joints water-tight than to keep the stones together, this being effected by their weight or by iron clamping. Formerly the mason required far more accurate and extensive knowledge of geometry than is possessed by persons of the trade at present; this was when he was called on to construct groined and vaulted roofs, enriched with carved work and pendent corbels, where the nicest workmanship was required, to ensure the stability of the light and graceful columns and vaulting of a Gothic cathedral. It was this possession of superior skill and knowledge that caused the establishment of the Society of Free Masons, which dates its rise from the tenth or eleventh century.

Marble, from its costliness, and the difficulty of working it, is seldom, if ever, used in solid pieces in buildings; thin facings of it are set upon stone *backings*, much as rare woods are used in *veneering* by the cabinet-maker. The marble is sawn into thin slabs, like other stone, and the face is polished by rubbing on it the surface of another piece, fine sand, mixed up with water, being used to cause abrasion.

## PROCESSES BY WHICH THE EARTH IS CLOTHED WITH PLANTS.

No one can have seen a lake, without observing that wherever a river flows into it, the borders consist of meadows, or of marshy land, or both: while the marsh is a preliminary to the meadow, and is finally converted into one. If the whole process be watched, it will be found to commence in the shoaling of the bottom at the entrance of the river, sometimes producing islands, or banks, which, gradually attaining the level of the water, become first marshy tracts, and are finally elevated so as to form solid plains of meadow land. The progressive deposition of earth and stones by the river is here the fundamental cause: and as far as this acts on that land which has already surmounted the general level of the water, the increase is the result of inundations extending themselves over it. The consequent effects are the narrowing, the shortening, or the dividing of lakes, and ultimately their obliteration, so that nothing at length remains but a river traversing a plain; while the practical and obviously designed result is, in all cases, an acquisition of new and valuable lands. The object here is to point out that portion of the total plan which is effected by the intervention of the living and vegetable creation, through the inclinations, or instincts, of plants appointed for the completion of this great design of clothing the earth.

It is a striking proof of design, that two processes, entirely distinct in their natures, are brought to bear

\* Continued from Vol. IX., p. 40.

on the production of one effect: the second being also prepared to follow and complete what had been commenced by the first. It is a further proof of such a regular and fore-ordained plan, that while the general inclinations and structures of the plants destined to this end are peculiar, so is there among them a still further gradation of inclination and structure: a succession of distinct desires and powers, which enable some to commence that portion of the general duty which others are to take up, and others again to terminate, while none of these can perform the office of their associates in the work. In every case, even under the absence of all analogy, we must grant that such a mode of proceeding bespeaks a design: it is impossible to doubt it for a moment, when we find man himself pursuing the same system, and, whether he knows or not that he is imitating nature, sowing vegetation to secure and consolidate the mud which his piers and dams have detained, that he may gain a new territory from the waters.

In the proceedings of nature, however, the plan is more perfect; and while the results are more numerous, the provisions for each are as minute and accurate, as the effects themselves are unfailing. Not only is the new land consolidated, but the plants are constructed with powers to detain what would otherwise have floated on with the stream, to be lost in the ocean; that most valuable portion of the whole deposit, on which the unceasing fertility of these new lands is to depend. And while the living plants serve to detain and to bind, the dead ones are ordained, in their generations, to fertilize, and, still further, to aid in elevating the new plains beyond the eventual inroads of the waters. A short list, selected from a numerous catalogue of plants, will furnish that detailed evidence which the reader can easily verify and extend.

In the sea, it is the *Zostera* chiefly, which, with its long, numerous, and firm roots, lays the first foundation of that which will afterwards become a salt-marsh; acting beneath the water, like those far different plants which consolidate the dry sands of the adjoining shores. In fresh-water lakes the *Scirpus ocularis*, *Subularia aquatica*, and others, perform the same initial duty: and when we find that all these plants have been created to live and to propagate entirely under water, we cannot doubt that they were appointed to the very office which they execute so well. But in fresh waters, if not, with us at least, correspondently, in the sea, the detension and consolidation of earthy matters are effected by many more plants, not purely subaqueous; but of an amphibious nature. These root beneath the water, but grow above it; acting by means of their stems and their crowded growth, in detaining what their roots consolidate, or checking that action of the waves which would diffuse the earths along the bottom, and retard the desired effect. Such are the bulrush and the common reed. The student of nature should examine for himself the various plants, *Nymphæas*, *Charas*, *Hottonia*, *Butomus*, &c., which take their shares in this useful work. But it is most important to remark that there is some one, or more, adapted to every possible situation and circumstance under which this work may be carried on. Thus have structures and inclinations been provided, not merely for the sea and for fresh water, but for every variety of each: for the pure ocean, and the brackish æstuary of a river, for the clear lake, the rapid river, the alpine pool, the heated pond, and the foul and stagnant ditch. The *Scirpus maritimus* and the *Ruppia* thrive where the bulrush and the *Potamogetons* could not exist: the *Lemna* does its best to reclaim that pond

which would bear no other plant: the *Lobelia* shuns the poisonous ditch which the *Hydrocharis* prefers, and the *Ranunculus aquatilis*, appointed to this duty in that shallow pool which the first heats of Summer evaporate, is equally content to live beneath the water, and on the dry land; amply provided with means, as with inclinations, for each mode of life. But he who would scan the whole of this great design, must investigate all this; while, if he would see, under one striking view, what the Author of nature effects in this manner, he must not confine himself to the rivers or the lakes, the marshes or the coasts of our own country, but turn the eye of botany and geography on the singularly rooted mangroves, the gigantic reeds, and other uncounted plants, which cover the swamps of the torrid climates, and are daily converting unnumbered miles of sea, and river, and lake, into habitable land. He will not doubt the ultimate value of the result, when he finds the marshy woods of Borneo, occupying hundreds of square miles, all gained from the ocean by the labours of the vegetable world.

The plants, however, which had performed the work thus far, can do no more when once the new land has surmounted the surface of the water. A new set therefore has been appointed to carry it on to its completion. The *Salicornia*, *Arenaria*, &c., perform, on the sea shores, that for which there are provided, near fresh waters, marsh plants beyond numbering, including even trees, like the willows with us, and the palms in hot countries, which aid in the great work. Thus does the marsh at length become a plain, fitted for pasturage or agriculture, or demanding only the further labours of him for whose use it was rescued from the waters. The last race has deserted it, as preceding ones had abandoned what they had produced: yet each is still performing its appointed duties: and, if excluding itself by its own actions when it could no longer be useful, continuing to prepare a new place for its successors, to surrender it again when it has executed the will of Him, of whom it is the blind but obedient agent.

An analogous but different proceeding must here be noted, independently of water. This consists, fundamentally, in the deposition of sand on sea shores; the winds performing, in this case, what the water does in the other. And however injurious the consequences may occasionally be, in the overwhelming of fertile lands, I have little doubt that the general results are beneficial, as that the whole was designed. Mankind is ever more ready to complain of injuries than to be thankful for advantages.

If this sand is not universally calcareous, it is such far most commonly: while, as the produce of sea shells, the levity of the fragments allows this kind, at least, to be most widely dispersed, so as to become calcareous manure to places within its reach, and thus producing valuable collateral effects, in addition to the accession of territory thus gained from the bottom of the sea.

Here, as in the case of deposits from water, the prime object was consolidation, that the winds might not destroy what they had produced; and the second was to induce a more fertile surface, by the addition of vegetable matter. And both are accomplished by the same means, through a special creation of plants, provided with inclinations to occupy those places, and powers to effect these purposes. All of them are willing to grow in sand and some will grow nowhere else; while the others, equally prospering on the incipient pasture, form the connecting link through which it is to be completed. Here alone we see the proofs of design: but no doubt can remain



when we examine the long roots of these plants, tenacious as they are numerous, and intersecting the sand in every direction, as if the root, rather than the plant, was the contrivance and the object, and thus rendering it a firm mass.

Among these, on our own shores, the Elymus, Triticum, Arundo, and Carex of the sand, are the most familiar, as they are the pioneers in this great work; but few can be unacquainted with the Convolvulus, Bunias, and Euphorbias, of the sea shores, with the Eryngo, the Matthiola, the Kali, &c. : while, knowing the general desires of plants for soil and water, we might wonder at a choice so apparently unreasonable, did we not know by whom that choice was directed.

Though the chemical powers of nature convert the rock into soil, that operation is often slow. There are situations also where soil cannot rest; or else it becomes removed, from the flow of water. Here it is, that the vegetable agents are ordained to act, as here they are made to inhabit; and from this point their actions are most easily traced. And when we find that a specific family of plants, utterly unlike all others, in their instincts or affections, as in their nature, their structure, and their powers, execute this prime office, surrendering their places afterwards to a second, scarcely less remarkable in these respects, yet approaching nearer to the general vegetable world; as they are also the immediate precursors of those more perfect and more widely useful plants, we cannot for an instant doubt the design. It is in the multitudinous and incomprehensible tribe of lichens and analogous plants, that we find these pioneers of vegetation, seeking their places where no others could exist; demanding no water, requiring no soil; rootless, leafless, flowerless, if not seedless, perpetuated we know not how, unsusceptible of injury short of destruction, and, if not immortal, tenacious of life as are the seeds of plants themselves, and capable of almost equal dormancy. What their anatomy is, no one has ascertained; and if they do produce seeds to be spread by the winds, we have still to explain how that which must be lighter than the winds themselves, and which the microscope cannot discover, should adhere to the solid rock.

But the Creator has only to will, and it is done: nor can we contemplate this extraordinary form of vegetable life, without reflecting on the power which has given that life to such an organization, so unlike to almost all else, yet so perfectly adapted to the purposes which it was created and commanded to serve. And if the species are so numerous that they are yet uncounted, so are there kinds allotted for different qualities of rock, and for different surfaces; for the calcareous and the flinty, for the smooth and the rough, for the precipice, or the wall, or the bark of a tree. Thus also are there individuals appointed for the damp and dark forest, the sunny and arid cliff, the frozen Alpine summit, and the salt sea shore, the climate of Bengal, and the snows of Greenland.

It is a general law for plants that water is essential to their existence, and that deprived of this, once dried, they are irrecoverably dead; though many have been enabled to retain it with almost miraculous obstinacy under the most unfavourable circumstances. But had this law involved the lichens, it would have been fatal to their appointed duties; while their bulk and structure are commonly such as to have rendered the retention of moisture impossible. Exposed to a burning sun, on naked rocks, and without the means of resisting its influence, they are often so dried as to crumble at a touch: while this condition is sometimes of daily occurrence. Their very races might have been exterminated; but the Creator never leaves his work

imperfect. He has made an exception to the general law: the principle of life is not withdrawn, and they are ready to revive and resume their functions at the slightest return of moisture.

In whatever way the foliaceous and the shrubby lichens may assist, the result is to lay the foundation of a soil on the naked rock, partly through their own living structures, partly through their decomposition, and partly through the flying particles of earth which they detain. But the soil thus produced is unfitted to give a hold or a place to the larger and more perfect vegetables. A new tribe of plants, of a higher organization than their precursors, yet inferior to those which are to follow, has been created for this end. These are the mosses, and their variety resembles that of the lichens. These have scarcely the power of rooting themselves on a naked surface, if we except the barks of trees; but they attach themselves readily to the least quantity of soil, as formed and collected by the lichens: and that they execute the office of forming additional soil, the least observation will show.

Their office being at length performed, there is room and lodgment afforded for plants of greater bulk and more perfect structure: and he who examines the summit of a wall where the grasses, the Arabis Tunitis, Sedum, &c. are rooted in their mossy cushions, will see those plants which are destined to replace their immediate predecessors, still adding to that soil which may one day bear the trees of the forest.

Let him who reads or observes never forget that in all this, as in everything else, there is nothing casual, nothing purposeless, nothing undesigned: that good ends have been intended, as good purposes have been effected; and that all creation everywhere presents to him who will examine it, the most incontrovertible proofs of a Great Artist, intending, designing; perfect in wisdom, and absolute in power.

[Abridged from MACCULLOCH's *Proofs and Illustrations of the Attributes of God.*]

#### TO A WATERFOWL.

Whither 'midst falling dew,

While glow the heavens with the last steps of day,

Far through their rosy depths, dost thou pursue

Thy solitary way?

Vainly the fowler's eye

Might mark thy distant flight to do thee wrong,

As, darkly painted on the crimson sky

Thy figure floats along.

Seek'st thou the plashy brink

Of weedy lake, or maze of river wide,

Or where the rocking billows rise and sink

On the chafed ocean-side?

There is a Power whose care

Teaches thy way along that pathless coast

The desert and illimitable air,

Lone wandering, but not lost.

All day thy wings have fanned,

At that far height, the cold thin atmosphere!

Yet stoop not, weary, to the welcome land,

Though the dark night is near.

And soon that toil shall end,

Soon shalt thou find a Summer-home, and rest,

And scream among thy fellows: reeds shall bend

Soon o'er thy sheltered nest.

Thou'rt gone, the abyss of heaven

Hath swallowed up thy form; yet, on my heart,

Deeply hath sunk the lesson thou hast given,

And shall not soon depart.

He, who from zone to zone,

Guides through the boundless sky thy certain flight,

In the long way that I must tread alone,

Will lead my steps aright.—BRYANT.

## NOTES ON FOREST TREES. No. XXII.

THE MANGROVE, (*Rhizophora manglier.*)

THE trees of this tribe are peculiar to the shores of the oceans and large rivers of the tropics, where they form dense forests, reaching almost to the waters. The Mangrove is a tree about fifty feet in height, and its mode of growth is very singular, resembling that of the banian, or Indian fig. The tree is only found in marshy places: its branches, after growing for some time in the usual manner, suddenly bend downwards and grow towards the earth; as soon as they reach the moist soil, they take root, and thus each branch forms a stem capable of supporting itself without dependence on the parent tree; in this manner one tree will, in course of time, form a complete grove. The forests thus formed by an assemblage of Mangrove trees are almost impenetrable, and in addition to the difficulties offered by the thickness of their growth, their recesses are the favourite haunts of myriads of mosquitoes, sufficient to deter the most enduring from the attempt to explore them. An innumerable quantity of birds, chiefly aquatic, take shelter under their branches, while the shallow pools which abound among them form the lurking places of thousands of crabs and of aquatic insects. These amphibious forests are at times inundated by the sea, and on the retreat of the water, numerous oysters and other shell-fish are found adhering to the trees. So that, although the difficulty of penetrating these thick shades is very great, the enterprising sportsman is tolerably sure of being well rewarded for the dangers he has to undergo by an abundance of game.

A singular fact is attached to the history of the Mangrove, namely, the germination of the seeds while they are yet attached to the branches of the tree; these afterwards fall and take root in the ground.

The wood of the Mangrove is good for little else

than fuel, but the bark and the seed-vessels are used in tanning hides and in dyeing black.



There are as many as four or five species of the Mangrove, whose native countries are the warmer parts of the New World, and the coast of Malabar in the East Indies.

THE regard to the general rules of morality is what is properly called a sense of duty; a principal of the greatest consequence in human life, and the only principle by which the bulk of mankind are capable of directing their actions. There is scarce any man who, by discipline, education, and example, may not be impressed with a regard to these general rules of conduct, as to act upon almost every occasion with tolerable decency, and through the whole of his life, avoid a tolerable degree of blame. Without this sacred regard to the general rules of morality, there is no man whose conduct can be much depended upon. It is this which constitutes the most essential difference between a man of principle and honour, and a worthless fellow. The one adheres on all occasions, steadily and resolutely to his maxims, and preserves through the whole of his life, one even tenour of conduct. The other acts variously and accidentally, as humour, inclination, or interest, chance to be uppermost.—ADAM SMITH.

THE willow which bends to the tempest, often escapes better than the oak which resists it; and so, in great calamities, it sometimes happens, that light and frivolous spirits recover their elasticity and presence of mind sooner than those of a loftier character.—SIR WALTER SCOTT.

YOUTH is the time of enterprise and hope; having yet no occasion of comparing our force with any opposing power, we naturally form presumptions in our own favour, and imagine that obstruction and impediment will give way before us. The first repulses rather inflame vehemence than teach prudence; a brave and generous mind is long before it suspects its own weakness, or submits to sap the difficulties which it expected to subdue by storm. Before disappointments have enforced the dictates of philosophy, we believe it in our power to shorten the interval between the first cause and the last effect; we laugh at the timorous delays of brooding industry, and fancy that by increasing the fire we can, at pleasure, accelerate the projection.—JOHNSON.

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